

iXs Research Corp.

Cool Robotics

RM-eye instruction manual Ver.1.0

iXs Research Corp.

Instruction for caution terms and marks

This instruction manual shows some caution terms and marks in order to avoid accidents under incorrect use. Each term and mark means is that

 Attention	This term and mark shows that user or other persons may have heavy injury when you operate it ignoring this.
 Warning	This term and mark shows that user or other persons may die or have heavy injury when you operate it ignoring this.
 Danger	This term and mark shows that user or other persons may suffer from die or heavy injury when you operate it ignoring this.

Attention for your safety

Usage and handling

 Danger Don't handle this board and software where children can touch.	 Danger Don't use near water, throw into water. It may induce electric short, fire or electric shock.	 Danger Don't use near iron material things. It may induce electric short, fire and electric shock.
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Assurance and After services

Please read carefully

1. System matching
 - 1.1. When you attach this board to other system such as a personal computer and when you install this software to a personal computer, the manufacturer doesn't have the responsibility the matching with your systems.
 - 1.2. If you want the matching between this board and your systems, we can support with charge.
2. Assurance range of a product
 - 2.1. Items which are not indicated on a product specification are out of assurance.
 - 2.2. The update, revision and bug fix will be executed without any preliminary announces.
 - 2.3. Accidents with customer's modification and any other changes are out of manufacturer responsibility.
3. Assurance term of a product
 - 3.1. The assurance term of a product without any other contract is a week after delivery.
 - 3.2. The repair service is send back service by shipping. Customer should owe the shipping charge from customer to manufacturer.
 - 3.3. Following cases are out of assurance even if it is in assurance term.
 - 3.3.1. Accidents and injury when customers use incorrect use.
 - 3.3.2. Accidents and injury concerning any other software which customers install to a computer.
 - 3.3.3. Fire, disaster, catastrophical, gases and over voltage.
 - 3.3.4. The modifications and any other changes by customers except for with manufacturer's advices.
4. Assurance by secondary damage

Manufacturer does not owe the responsibility the free exchange and compensation damages such as product's defect or trouble.
5. Attention for security

This product is only for research, industry and hobby, it does not take safety for life into account. Manufacturer does not owe the responsibility for it. Do not use other purposes.
6. Repair
 - 6.1. Customers should owe the repair fee expect for assurance term.
 - 6.2. Manufacturer does not lend substitute product during repair.
 - 6.3. When customer send product back to a manufacturer for repair, customers should back up their data by themselves. Manufacturer sometimes reset whole data during repair without any back up.
 - 6.4. Manufacturer decline products which are polluted by radial rays, disease germ or any other pollution.
 - 6.5. The repair is basically send back method without any other contract. Customers should owe the shipping charge from customers to manufacturer. If customers require the trip services, manufacturer requires traveling expenses and traveling benefits.
7. About copyright
 - 7.1. Copyright of products and software which are used in this instruction manual are belonging each vendor company.
 - 7.2. This instruction copyright belongs iXs Research Corporation.

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1. Introduction

This is an instruction manual for RM-eye. RM-eye is a color detection board using CMOS camera. You can select a desired color (RGB format), and it send back a center of gravity (COG) and size of selected color. Then you can define a serial command corresponding with a COG location on its view image.

This manual is subject to modify without any notice, so please download the latest version from the website of the iXs research corporation.

2. System Configuration

2.1 Part Name

Figure 1 shows a part name of RM-eye.

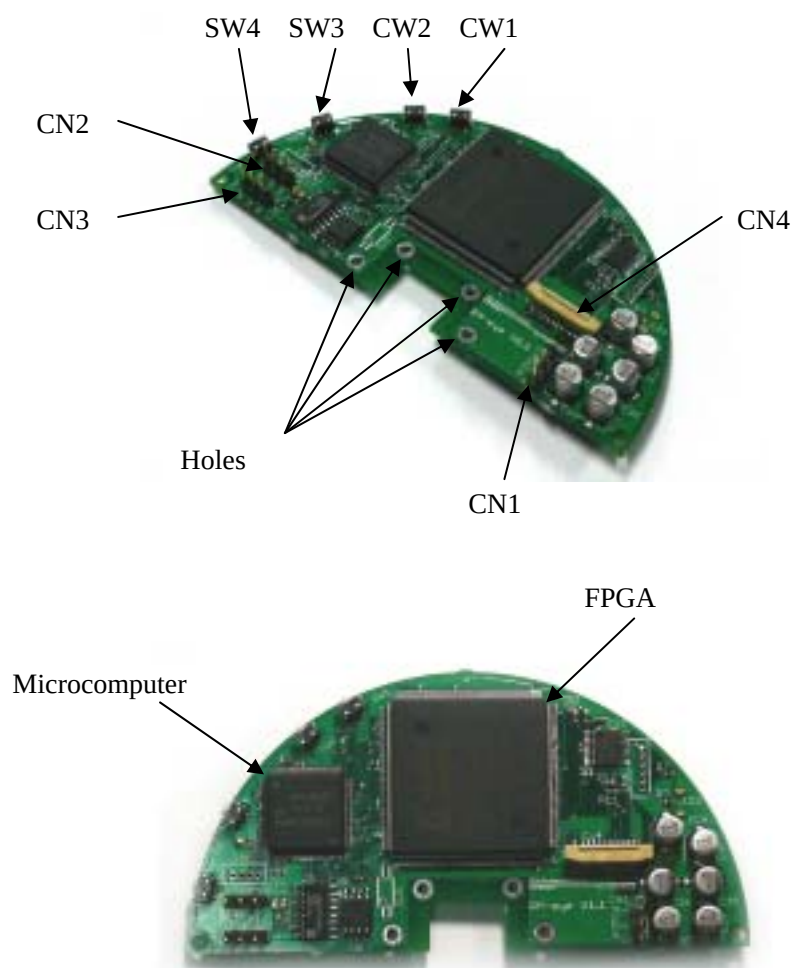


Figure 1. Name of part

2.2 Connector and Pin Function

From Table 1 to 3 shows a function of each connector and switch.

Table 1. CN1(Power input connector)

Pin	Function
1	NC
2	DC5V~12V
3	GND

Table 2. CN2(Serial output connector RS-232C level)

Pin	Function
1	TX
2	RX
3	GND

Table 3. CN3(Serial output connector RS232C level)

Pin	Function
1	RX
2	TX
3	GND

Table 4. SW1(White balance ON/OFF)

Status	Function
*LED1:ON	Auto white balance ON
*LED1:OFF	Auto white balance OFF

*LED blink is changed by SW1 Push-Release

Table 5. SW2(Mode select)

状態	機能
*LED2:ON	Motion command generation mode
*LED2:OFF	Camera function setting mode

*LED blink is changed by SW2 Push-Release

Table 6. SW3(Reserved)

Condition	Function
Push	Reserved
Release	OFF

Table 7. SW4(Reserved)

Condition	Function
Push	Reserved
Release	OFF

Table 8. SW5(CPU mode)

Mode	Pin1	Pin2
Normal	OFF	OFF
Firmware update	ON	ON

2.2 Specification

Table 8 shows a specification of RM-eye.

Table 8 Specification

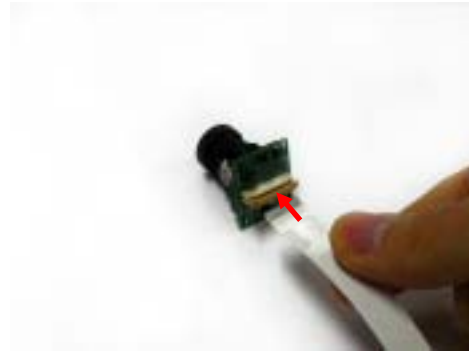
Camera		1/4 inch CMOS image sensor 280,000 pixels
Image sensor		Omnivision Technologies OV7640
Image size		(VGA) 640 x 480
Color format		RGB
Frame rate		Max 30fps
Optical Lens	Focal length	2.9 [mm]
	F value	2.0
	Field angle (Horizontal, Vartical, Diagonal)	74deg, 54deg, 94deg
	Structure	4 Glass
	Distortion rate	-4.9%
Number of detect color		Upto 6
Output data format		(X[i], Y[i], R[i]) (i=0,1,2,3,4,5), 320 * 240 size binary image, Serial command
Interface		RS232C (115.2 kbps)
Input power supply		DC5~12V (Max 2.2W)
Software required environment		OS/WindowsXP/2000 CPU/PentiumIII over, RAM 128MB over required .NetFramwork2.0 is installed
Language		Japanese/English
Dimension	Main board	D100 [mm] half circle (D)100 * (W)50 * (H)5 [mm] Hole location : 4-phai 2.4 for KRS-788 and KRS-4014 screw position
	Camera module	(D)18 * (W)22 * (H)23 [mm]
Flexible cable length		About 90 [mm]
Weight		About 20[g]

2.3 Camera connection

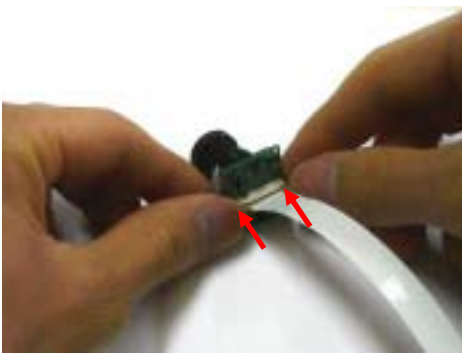
Figure 2 shows how to connect between camera module and main board. Please pay attention the direction of a flexible cable.



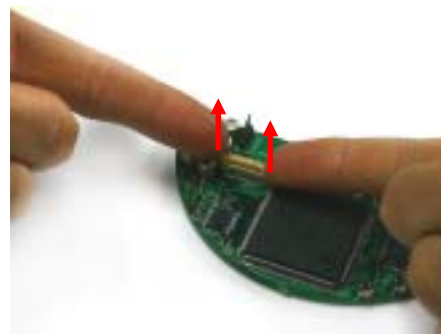
Loosen a connector cover of a camera module



Insert a flexible cable to a connector



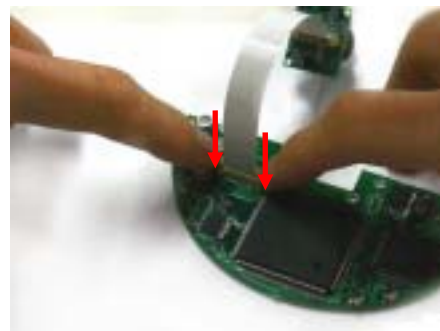
Lock a cover and fix a cable



Loosen a connector cover of a main board



Insert a flexible cable to a connector



Lock a cover and fix a cable

Figure 2. Connection between a main board and a camera module



Figure 3. Whole view of RM-eye

3. Connection with other equipments

3.1 Connection with a power supply

In order to supply a power, you can connect a 3pin parallel straight cable to a CN1 on RM-eye. Please insert a stable DC power without motor or other noises. If you use a noisy DC power, a RM-eye will reset or be broken.

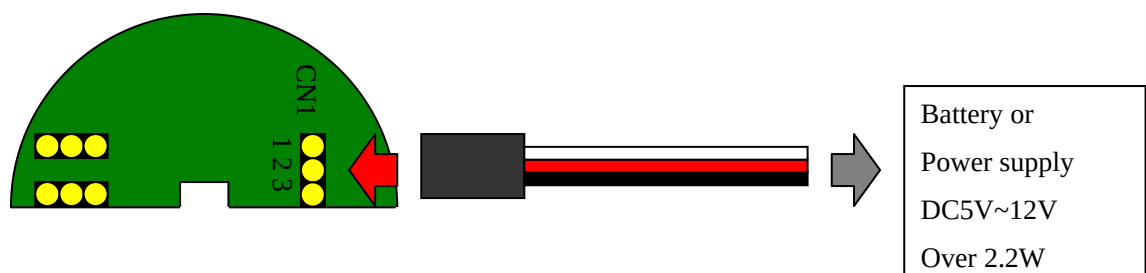


Figure 4. Connection with a power supply

3.2 Connection with a PC

In order to communicate with a PC, you can connect a 3pin serial straight cable to a CN2 on a RM-eye.

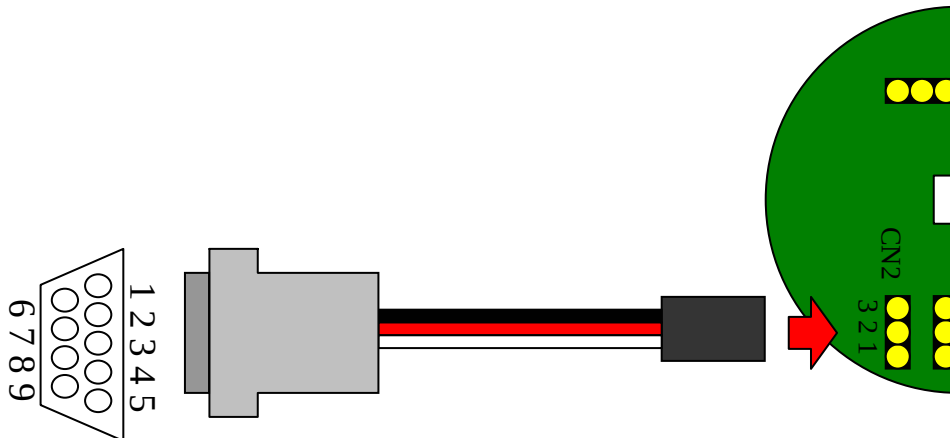


Figure 5. Connection with PC

Table 9. Pin function of a serial straight cable

Pin	Function	RM-eye
1	NC	-
2	RX Connect to pin4 with 220 ohm	1
3	TX	2
4	Connect to pin2 with 220 ohm	-
5	GND	3
6	NC	-
7	Connect to pin8	-
8	Connect to pin7	-
9	NC	-

You can use a serial straight cable which is a standard equipment of KHR-1, KHR-2HV, KHR-1HV and Manoi.

3.2 Connect with a RCB-1, RCB-3(J) and PWM-board

In order to communicate with RCB-1, RCB-3(J) and PWM-board, you can connect a 3pin parallel straight cable to a CN3 on RM-eye. Please refer a pin layout for RCB-1, RCB-3(J) and PWM-board from their documentations.

You can connect with CN3 to their board with straight cable because CN3 is a crossover serial output.

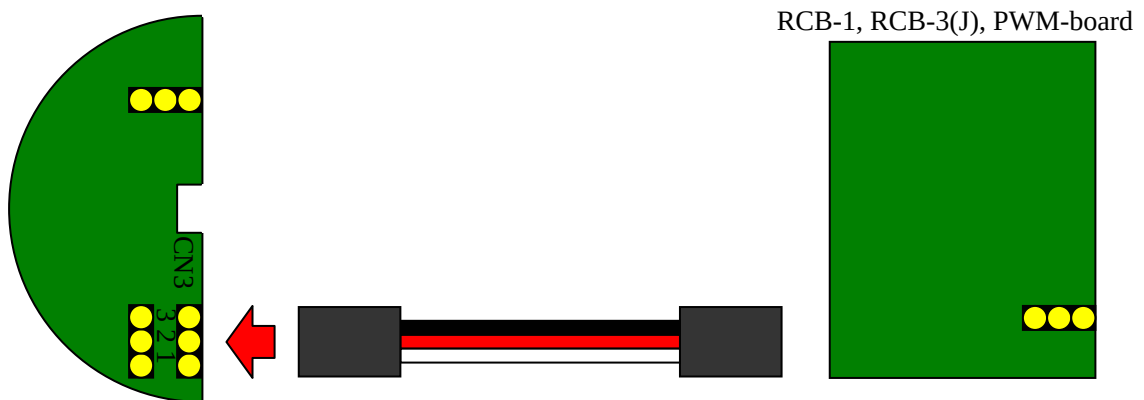


Figure 6. Connection with RCB-1, RCB-3(J) and PWM-board

4. RM-eye setup

4.1 Setting parameters using a original software

In order to use RM-eye, you can set up some parameters using a original windows software. Please refer a RM-eye install manual.

And please refer a help menu in RM-eye windows software concerning detail functions.

5. Mount RM-eye on a robot



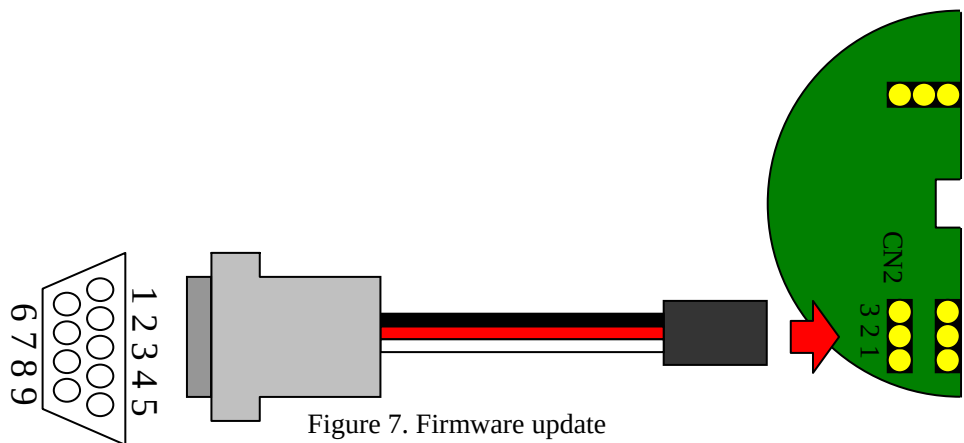
Appendix 1. Firmware update

In order to update a firmware of RM-eye, you can connect between CN2 and PC using a serial straight cable.

After confirmation that a power is shut down, you can slide pin1 and pin2 of SW5 to “ON”, and turn on a power.

Please download a latest firmware from RM-eye support page, and update a firmware using writing software. After writing a firmware, you can turn off a power and slide pin1 and pin2 of SW5 to “OFF”.

Please notice that parameters which you set is deleted if you update a firmware.



Pin	Function	RM-eye
1	NC	-
2	RX Connect to pin4 with 220 ohm	1
3	TX	2
4	Connect to pin2 with 220 ohm	-
5	GND	3
6	NC	-
7	Connect to pin8	-
8	Connect to pin7	-
9	NC	-

You can use a serial straight cable which is a standard equipment of KHR-1, KHR-2HV, KHR-1HV and Manoi.

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